

Amendments to the Claims

Please amend the claims as follows.

1. (Currently Amended) An unsupported catalyst composition, wherein said unsupported catalyst composition comprises: a Group VIb metal component, a Group VIII metal component, and a refractory oxide material, wherein said Group VIb metal component, said Group VIII metal component, and said refractory oxide material are combined together prior to shaping said unsupported catalyst composition, wherein said refractory oxide material comprises 50 wt % or more titania, on an oxide basis, and wherein said refractory oxide material includes titania powder having an average particle diameter of 50 microns or less and ~~said titania has a B.E.T. surface area in the range of from 10 to 700 m²/g.~~
2. (Previously Presented) An unsupported catalyst composition as claimed in claim 1, wherein the refractory oxide material comprises said titania in an amount in the range of from 70 to 100 wt %.
3. (Previously Presented) An unsupported catalyst composition as claimed in claim 2, wherein the refractory oxide material comprises said titania in an amount in the range of from 95 to 100 wt %.
4. (Previously Presented) An unsupported catalyst composition as claimed in claim 3, wherein said unsupported catalyst composition contains an amount of said refractory oxide material in the range of from 5 to 70 wt %, based on the total weight of said unsupported catalyst composition and; on an oxide basis.
5. (Previously Presented) An unsupported catalyst composition as claimed in claim 4, wherein said amount of said refractory oxide material contained in said unsupported catalyst composition is in the range of from 10 to 30 wt % of the total weight of said unsupported catalyst composition.

6. (Currently Amended) An unsupported catalyst composition as ~~recited~~ claimed in claim 5, wherein the Group VIb metal component is selected from the group consisting of molybdenum, tungsten and a mixtures thereof, and the Group VIII metal component is selected from the group consisting of nickel, cobalt and a mixture thereof.
7. (Withdrawn) A process for the preparation of a catalyst composition as claimed in claim 1, wherein one or more Group VIb metal compounds are combined with one or more Group VIII metal compounds, and with a titania-containing refractory oxide material, in the presence of a protic liquid and an alkali compound; and the catalyst composition is recovered following precipitation.
8. (Withdrawn) A process as claimed in claim 7, wherein at least one of the metal compounds is partly in solid state and partly in dissolved state.
9. (Withdrawn) A process as claimed in claim 8, which comprises heating a precursor composition which is in the form of, or is recovered from, a slurry, after aging at a temperature in the range of from 20 to 95 deg C for a minimum of 10 minutes, said slurry being obtained by (co)precipitating, at a sufficient time and temperature, one or more Group VIb compounds, one or more Group VIII compounds, one or more refractory oxide materials, and an alkali compound, in a protic liquid.
10. (Withdrawn) A process as claimed in claim 9, wherein the titania used has a particle diameter of 10 microns or less.
11. (Withdrawn) A process as claimed in claim 10, wherein all metal compounds are added to the protic liquid as solids.
12. (Withdrawn) A process as claimed in claim 11, wherein the catalyst composition is recovered by spray-drying.

13. (Withdrawn) A process as claimed in claim 12, wherein alkali compound is present and is ammonia or a component that will generate ammonium ions in the protic liquid used.

14. (Withdrawn) A process as claimed in claim 13, wherein the prepared catalyst composition is further subjected to any one or more of the following process steps carried out in any appropriate order: cooling; optionally isolating; drying; shaping, preferably by extrusion using no extrusion aids; calcining; sulphiding.

15. (Withdrawn) A hydroprocessing method, comprising:
contacting under hydroprocessing conditions a hydrocarbon feed with an unsupported catalyst composition comprising at least one Group VIII metal, at least one Group VIb metal and a refractory oxide material of which at least 50 wt% is titania.

16. (Withdrawn) A hydroprocessing method, comprising:
contacting under hydroprocessing conditions a hydrocarbon feed with the catalyst as claimed in claim 1, 2, 3, 4, 5, or 6 or the catalyst as prepared by the process of claim 7, 8, 9, 10, 11, 12, 13 or, 14.

17. (Withdrawn) A composition as prepared by the process of claim 7, 8, 9, 10, 11, 12, 13 or 14.

18. (Withdrawn) A method of preparing a catalyst composition, said method comprises:
combining a Group VIb metal compound, a Group VIII metal compound and a titania-containing refractory oxide material, in the presence of a protic liquid; and
recovering by precipitation said catalyst composition comprising at least 50 wt% titania on an oxide basis.

19. (Withdrawn) A method as recited in claim 18, wherein at least one of the metal compounds combined in the presence of said protic liquid is partly in solid state and partly in dissolved state.
20. (Withdrawn) A method as recited in claim 19, wherein said recovering step includes: subjecting a mixture resulting from said combining step to coprecipitation conditions thereby forming a coprecipitate solid and heating said coprecipitate solid at an elevated temperature so as to yield said composition.
21. (Withdrawn) A method as recited in claim 20, wherein said protic liquid comprises water, and further combined with said non-noble Group VIb metal compound, said non-noble Group VIII metal compound, and said titania-containing refractory oxide is an alkali compound.
22. (Withdrawn) A method as recited in claim 21, wherein said coprecipitation conditions include maintaining said mixture at a coprecipitation temperature in the range of from 25 to 95 °C for a period of time in the range of from 10 minutes to 2 hours.
23. (Withdrawn) A method as recited in claim 22, wherein said elevated temperature is in the range of from 100 °C to 600 °C.
24. (Withdrawn) A method as recited in claim 23, wherein said alkali compound is ammonia or a material that will generate ammonium ions in the protic liquid of said mixture.
25. (Withdrawn) A method as recited in claim 24, wherein the titania used in said combining step has a particle diameter of 10 microns or less.
26. (Withdrawn) A method as recited in claim 25, wherein said catalyst composition is recovered by spray drying.

27. (Previously Presented) An unsupported catalyst composition as claimed in claim 1, wherein said Group VIII metal component is present in said unsupported catalyst composition in an amount in the range of from 2 to 80 wt %, based on the total weight of the unsupported catalyst composition and on an oxide basis; wherein said Group VIb metal component is present in said unsupported catalyst composition in an amount in the range of from 5 to 90 wt %, based on the total weight of the unsupported catalyst composition and on an oxide basis; and wherein said refractory oxide material is present in said unsupported catalyst composition in an amount in the range of from 5 to 70 wt %, based on the total weight of the unsupported catalyst composition and on an oxide basis.

28. (Previously Presented) An unsupported catalyst composition, wherein said unsupported catalyst composition comprises: a Group VIb metal component, a Group VIII metal component, and a refractory oxide material, wherein said refractory oxide material comprises 50 wt % or more titania, on an oxide basis, wherein said Group VIII metal component is present in said unsupported catalyst composition in an amount in the range of from 2 to 80 wt %, based on the total weight of the unsupported catalyst composition and on an oxide basis, wherein said Group VIb metal component is present in said unsupported catalyst composition in an amount in the range of from 5 to 90 wt %, based on the total weight of the unsupported catalyst composition and on an oxide basis, wherein said refractory oxide material is present in said unsupported catalyst composition in an amount in the range of from 5 to 70 wt %, based on the total weight of the unsupported catalyst composition and on an oxide basis, and wherein said titania of said refractory oxide material includes titania powder having an average particle diameter of 50 microns or less.

29. (Previously Presented) An unsupported catalyst composition as claimed in claim 28, wherein the total amount of said Group VIII metal component and said Group VIb metal component in said unsupported catalyst composition is in the range of from 30 to 95 wt % based on the total weight of the unsupported catalyst composition and on an oxide basis.

30. (Previously Presented) An unsupported catalyst composition as claimed in claim 29, wherein said Group VIII metal component, said Group VIb metal component, and said refractory oxide material of said unsupported catalyst composition are a co-precipitate.

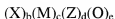
31. (Previously Presented) An unsupported catalyst composition as claimed in claim 30, wherein in excess of 70 wt % of said titania of said refractory oxide material is in the anatase form.

32. (Previously Presented) An unsupported catalyst composition as claimed in claim 31, wherein said titania of said refractory oxide material has a B.E.T. surface area in the range of from 10 to 700 m²/g.

33. (Previously Presented) An unsupported catalyst composition as claimed in claim 32, wherein said unsupported catalyst composition has a characteristic loss on ignition (LOI) that is in the range of from 5 to 95%.

34. (Previously Presented) An unsupported catalyst composition as claimed in claim 32, wherein said unsupported catalyst composition is further calcined.

35. (Previously Presented) An unsupported catalyst composition as claimed in claim 32, wherein said unsupported catalyst composition has the following general formula:



wherein

X represents at least one non-noble Group VIII metal;

M represents at least one non-noble Group VIb metal;

Z represents titanium and optionally one or more elements selected from aluminium, silicon, magnesium, zirconium, boron and zinc;

O represents oxygen;

one of b and c is the integer 1; and

d, e, and the other of b and c each are suitably a number greater than 0 such that the molar ratio of b:c is in the range of from 0.2:1 to 10:1, the molar ratio of d:c is in the range of from 0.1:1 to 30:1, and the molar ratio of e:c is in the range of from 3.4:1 to 73:1.

36. (Previously Presented) An unsupported catalyst composition, comprising:

a Group VIII metal component in an amount in the range of from 2 to 80 wt % based on the total weight of the unsupported catalyst composition and on an oxide basis;

a Group VIb metal component in an amount in the range of from 5 to 90 wt %, based on the total weight of the unsupported catalyst composition and on an oxide basis; and

a refractory oxide material in an amount in the range of from 5 to 70 wt %, based on the total weight of the unsupported catalyst composition and on an oxide basis, wherein said refractory oxide material comprises titania present in said refractory oxide material in an amount of 50 wt % or more, based on the weight of the refractory oxide material and on an oxide basis.

Claims 37-39 (Canceled).

40. (Currently Amended) An unsupported catalyst composition ~~as claimed in claim 39,~~ wherein said unsupported catalyst composition comprises: a Group VIb metal component, a Group VIII metal component, and a refractory oxide material, wherein said refractory oxide material comprises titania and another material selected from the group consisting of alumina, silica, magnesia, zirconia, boria and zinc oxide, and wherein said titania is present in said refractory oxide material in an amount of 50 wt % or more of said refractory oxide material, on an oxide basis, wherein said titania present in said refractory oxide material is an amount in the range of from 70 to 100 wt %, wherein the total amount of said Group VIII metal component and said Group VIb metal component in said unsupported catalyst composition is in the range of from 65 wt % to 95 wt %, based on the total weight of said unsupported catalyst composition and on an oxide basis, and wherein said titania of said refractory oxide material includes titania powder having an average particle diameter of 50 microns or less.

41. (Previously Presented) An unsupported catalyst composition as claimed in claim 40, wherein said unsupported catalyst composition includes a co-precipitate of said Group VIII metal component, said Group VIb metal component, and said refractory oxide material.

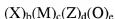
42. (Previously Presented) An unsupported catalyst composition as claimed in claim 41, wherein in excess of 70 wt % of said titania of said refractory oxide material is in the anatase form.

43. (Previously Presented) An unsupported catalyst composition as claimed in claim 42, wherein said titania of said refractory oxide materials has a B.E.T. surface area in the range of from 10 to 700 m²/g.

44. (Previously Presented) An unsupported catalyst composition as claimed in claim 43, wherein said unsupported catalyst composition has a characteristic loss on ignition (LOI) that is in the range of from 5 to 95%.

45. (Previously Presented) An unsupported catalyst composition as claimed in claim 44, wherein said unsupported catalyst composition is further calcined.

46. (Previously Presented) An unsupported catalyst composition as claimed in claim 45, wherein said unsupported catalyst composition has the following general formula:



wherein

X represents at least one non-noble Group VIII metal;

M represents at least one non-noble Group VIb metal;

Z represents titanium and optionally one or more elements selected from aluminium, silicon, magnesium, zirconium, boron and zinc;

O represents oxygen;

one of b and c is the integer 1; and

d, e, and the other of b and c each are suitably a number greater than 0 such that the molar ratio of b:c is in the range of from 0.2:1 to 10:1, the molar ratio of d:c is in the range of from 0.1:1 to 30:1, and the molar ratio of e:c is in the range of from 3.4:1 to 73:1.

47. (Previously Presented) An unsupported catalyst composition as claimed in claim 46, wherein the total amount of said Group VIII metal component and said Group VIb metal component in said unsupported catalyst composition is in the range of from 70 wt % to 95 wt %, based on the total weight of said unsupported catalyst composition and on an oxide basis.

Claim 48 (Canceled).

49. (Currently Amended) An unsupported catalyst composition ~~as claimed in claim 48,~~ wherein said unsupported catalyst composition comprises: a Group VIb metal component, a Group VIII metal component, and a refractory oxide material, wherein said refractory oxide material comprises titania in an amount of 50 wt % or more of said refractory oxide material, on an oxide basis, and wherein the total amount of said Group VIII metal component and said Group VIb metal component in said unsupported catalyst composition is in the range of from 65 wt % to 95 wt %, based on the total weight of said unsupported catalyst composition and on an oxide basis, wherein said titania of said refractory oxide material includes titania powder having an average particle diameter of 50 microns or less.

50. (Previously Presented) An unsupported catalyst composition as claimed in claim 49, wherein said unsupported catalyst composition includes a co-precipitate of said Group VIII metal component, said Group VIb metal component, and said refractory oxide material.

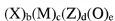
51. (Previously Presented) An unsupported catalyst composition as claimed in claim 50, wherein in excess of 70 wt % of said titania of said refractory oxide material is in the anatase form.

52. (Previously Presented) An unsupported catalyst composition as claimed in claim 51, wherein said titania of said refractory oxide materials has a B.E.T. surface area in the range of from 10 to 700 m²/g.

53. (Previously Presented) An unsupported catalyst composition as claimed in claim 52, wherein said unsupported catalyst composition has a characteristic loss on ignition (LOI) that is in the range of from 5 to 95%.

54. (Previously Presented) An unsupported catalyst composition as claimed in claim 53, wherein said unsupported catalyst composition is further calcined.

55. (Previously Presented) An unsupported catalyst composition as claimed in claim 54, wherein said unsupported catalyst composition has the following general formula:



wherein

X represents at least one non-noble Group VIII metal;

M represents at least one non-noble Group VIb metal;

Z represents titanium and optionally one or more elements selected from aluminium, silicon, magnesium, zirconium, boron and zinc;

O represents oxygen;

one of b and c is the integer 1; and

d, e, and the other of b and c each are suitably a number greater than 0 such that the molar ratio of b:c is in the range of from 0.2:1 to 10:1, the molar ratio of d:c is in the range of from 0.1:1 to 30:1, and the molar ratio of e:c is in the range of from 3.4:1 to 73:1.

56. (Previously Presented) An unsupported catalyst composition as claimed in claim 55, wherein the total amount of said Group VIII metal component and said Group VIb metal component in said unsupported catalyst composition is in the range of from 70 wt % to 95 wt %, based on the total weight of said unsupported catalyst composition and on an oxide basis.